Integrate DB2 HADR with Tivoli System Automation MP on Windows

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Introduction

This document demonstrates the installation of Tivoli System Automation MP Version 3.2.2 FixPack 6 in a Windows domain environment and then it shows you how you can integrate HADR into TSAMP.

The following 3 virtual machines are used.

VM Name	Role	IP Address	DB2 Version
host0	Windows Domain Controller	192.168.245.139	N/A
host1	HADR primary	192.168.245.134	V10.1 FP0
host2	HADR standby	192.168.245.135	V10.1 FP0

The VMs are running Windows Server 2008 R2 Enterprise Edition. Configuring Windows domain is not included in this document.

Installation

1. Install TSAMP

All components are installed using Windows domain user – DB2TT\Administrator. The user is added to 'Administrators' and 'Remote Desktop' groups.

(1) On Windows Server 2008, add the Windows feature "Subsystem for UNIX-based Applications" :

- Control Panel/ Programs/ Turn Windows feature on or off/ Add Features/Subsystem for UNIX-based Applications

(2) Download the "Utilities and SDK for UNIX-based Applications" package from Microsoft :

- **Windows Start menu > All Programs > Subsystem for UNIX-based Applications > Download Utilities for Subsystem for UNIX-based Applications**.

(3) Install "Utilities and SDK for UNIX-based Applications"

- Custom Installation
- Select SVR-5 Utilities&GNU Utilities&GNU SDK&Perl
- Enable checkbox “Enable SuToRoot behavior for SUA programs” and “Enable setuid behaviour for SUA programs”

(4) Update hosts file

- Add the following entries to %SystemRoot%\System32\drivers\etc\hosts

  192.168.245.134 host1
  192.168.245.135 host2

(5) Enable system logger daemon
In Korn Shell, cd /etc/init.d, Edit file syslog to uncomment two lines for SYSLOGD

(6) Run “Setup.exe” to install TSAMP 3.2.2 FixPack 6

2. Prepare TSA Cluster

(1) Prepare the hosts for cluster

```
$ preprpnode host1 host2
```

Refer to Troubleshooting section if you have errors here.

(2) Create TSA cluster domain

```
$ mkrpdomain db2ha host1 host2
$ lsrpdomain
Name  OpState RSCTActiveVersion MixedVersions TSPort GSPort
db2ha Offline 3.1.4.6          No            12347  12348
```

(3) Start the cluster domain

```
$ startrpdomain db2ha
$ lsrpdomain
Name  OpState RSCTActiveVersion MixedVersions TSPort GSPort
db2ha Online  3.1.4.6          No            12347  12348
$ lsrpnode
Name  OpState RSCTVersion
host1 Online  3.1.4.6
host2 Online  3.1.4.6
```

3. Create DB2 instance and create the instance resource in TSA

(1) Create DB2 instance

```
C:\Program Files (x86)\IBM\SQLLIB\BIN>db2icrt db2inst
DB20000I  The DB2ICRT command completed successfully.

C:\Program Files (x86)\IBM\SQLLIB\BIN>set db2instance=db2inst
```

(2) Copy TSA scripts if they don't exist at /usr/sbin/rsct/sapolicies/db2

Source directory: C:\Program Files (x86)\IBM\SQLLIB\samples\tsa\

Target directory: C:\Windows\SUA\usr\sbin\rsct\sapolicies\db2

(3) Customize db2.def and mkdb2 accordingly

```
$ flip -u db2.def
```

(4) Create DB2 instance resource in TSAMP

```
$ ./mkdb2
```

```
$ lssam
Online IBM.ResourceGroup:db2_db2inst_host1_0-rg Nominal=Online
        '- Online IBM.Application:db2_db2inst_host1_0-rs:host1
Online IBM.ResourceGroup:db2_db2inst_host2_0-rg Nominal=Online
        '- Online IBM.Application:db2_db2inst_host2_0-rs:host2
Online IBM.Equivalency:virpubnic_host1_host2
        |- Online IBM.NetworkInterface:BB089DF1-FF99-4442-9D3F-
460702AD62C3:host1
        '- Online IBM.NetworkInterface:5EB1EA2D-85DD-4DEE-B4BA-
```

Commented [hw1]: Instance resource group on host1

Commented [hw2]: Instance resource group on host2

```
A4F784F22FB9:host2
```

4. Setup HADR database

(1) On host1(Primary server), create the db

```
C:\Program Files (x86)\IBM\SQLLIB\BIN>db2 create db hadb
DB20000I  The CREATE DATABASE command completed successfully.
C:\Program Files (x86)\IBM\SQLLIB\BIN>db2 update db cfg for hadb using
LOGARCHMETH1 "DISK:c:\logs"
DB20000I  The UPDATE DATABASE CONFIGURATION command
completed successfully.
C:\Program Files (x86)\IBM\SQLLIB\BIN>db2 update db cfg for hadb using
LOGINDEXBUILD on
DB20000I  The UPDATE DATABASE CONFIGURATION command
completed successfully.
C:\Program Files (x86)\IBM\SQLLIB\BIN>db2 update db cfg for hadb using
HADR_LOCAL_HOST host1
DB20000I  The UPDATE DATABASE CONFIGURATION command
completed successfully.

C:\Program Files (x86)\IBM\SQLLIB\BIN>db2 update db cfg for hadb using
HADR_LOCAL_SVC db2c_DB2HA
DB20000I  The UPDATE DATABASE CONFIGURATION command
completed successfully.

C:\Program Files (x86)\IBM\SQLLIB\BIN>db2 update db cfg for hadb using
HADR_REMOTE_HOST host2
DB20000I  The UPDATE DATABASE CONFIGURATION command
completed successfully.

C:\Program Files (x86)\IBM\SQLLIB\BIN>db2 update db cfg for hadb using
HADR_REMOTE_SVC db2c_DB2HA
DB20000I  The UPDATE DATABASE CONFIGURATION command
completed successfully.

C:\Program Files (x86)\IBM\SQLLIB\BIN>db2 update db cfg for hadb using
HADR_REMOTE_INST db2inst
DB20000I  The UPDATE DATABASE CONFIGURATION command
completed successfully.

C:\Temp>db2 backup db hadb
Backup successful. The timestamp for this backup image is :
20131113214408
```

(2) On host2(Standby server), restore the db

```
C:\temp>db2 restore db hadb
DB20000I  The RESTORE DATABASE command completed successfully.
C:\temp>db2 update db cfg for hadb using HADR_LOCAL_HOST host2
HADR_REMOTE_HOST host1
DB20000I  The UPDATE DATABASE CONFIGURATION command
completed successfully.
```

```
C:\ProgramData\IBM\DB2\DB2COPY1\DB2INST>db2 start hadr on db
hadb as standby
DB20000I  The START HADR ON DATABASE command completed
successfully.
```

(3) On host1 again,

```
C:\ >db2 start hadr on db hadb as primary
DB20000I  The START HADR ON DATABASE command completed
successfully.
```

5. Create HADR resource in TSAMP

(1) Customize db2ip.def, hard.def and mkhadr, hadr_monitor.ksh, hadr_start.ksh, hard_stop.ksh accordingly

```
$ flip -u db2ip.def
```

(2) run mkhadr

```
$ ./mkhadr
```

(3) After the above, issue lssam

```
$ lssam
Online IBM.ResourceGroup:db2_db2inst_db2inst_HADB-rg Nominal=Online
        |- Online IBM.Application:db2_db2inst_db2inst_HADB-rs
                |- Online IBM.Application:db2_db2inst_db2inst_HADB-rs:host1
                '- Offline IBM.Application:db2_db2inst_db2inst_HADB-rs:host2
        '- Online IBM.ServiceIP:db2ip
                |- Online IBM.ServiceIP:db2ip:host1
                '- Offline IBM.ServiceIP:db2ip:host2
Online IBM.ResourceGroup:db2_db2inst_host1_0-rg Nominal=Online
        '- Online IBM.Application:db2_db2inst_host1_0-rs:host1
Online IBM.ResourceGroup:db2_db2inst_host2_0-rg Nominal=Online
        '- Online IBM.Application:db2_db2inst_host2_0-rs:host2
Online IBM.Equivalency:virpubnic_host1_host2
        |- Online IBM.NetworkInterface:BB089DF1-FF99-4442-9D3F-
460702AD62C3:host1
        '- Online IBM.NetworkInterface:5EB1EA2D-85DD-4DEE-B4BA-
A4F784F22FB9:host2
```

Commented [hw3]: HADR databse(HADB) resource group

Commented [hw4]: Virtual IP resource group

HA Tests

1. Failover test

(1) run “rgreq” command below

```
$ rgreq -o move db2_db2inst_db2inst_HADB-rg
Action on resource group "db2_db2inst_db2inst_HADB-rg" returned Token
"0xc954ab569629247db3b4885235500600" .
```

(2) verify in lssam

```
$ lssam
Online IBM.ResourceGroup:db2_db2inst_db2inst_HADB-rg Nominal=Online
        |- Online IBM.Application:db2_db2inst_db2inst_HADB-rs
                |- Offline IBM.Application:db2_db2inst_db2inst_HADB-rs:host1
```

```
            '- Online IBM.Application:db2_db2inst_db2inst_HADB-rs:host2
      '- Online IBM.ServiceIP:db2ip
            |- Offline IBM.ServiceIP:db2ip:host1
            '- Online IBM.ServiceIP:db2ip:host2
Online IBM.ResourceGroup:db2_db2inst_host1_0-rg Nominal=Online
      '- Online IBM.Application:db2_db2inst_host1_0-rs:host1
Online IBM.ResourceGroup:db2_db2inst_host2_0-rg Nominal=Online
      '- Online IBM.Application:db2_db2inst_host2_0-rs:host2
Online IBM.Equivalency:virpubnic_host1_host2
      |- Online IBM.NetworkInterface:BB089DF1-FF99-4442-9D3F-
460702AD62C3:host1
      '- Online IBM.NetworkInterface:5EB1EA2D-85DD-4DEE-B4BA-
A4F784F22FB9:host2
```

2. Primary instance failure test

(1) Kill the db2sysc process

```
$ kill -9 2712
```

(2) The standby will take over and become Primary

```
$ db2pd –db hadb –hadr
Database Member 0 -- Database HADB -- Active -- Up 0 days 00:02:37 -- Date
11/18/2013 16:17:02

                    HADR_ROLE = PRIMARY
                  REPLAY_TYPE = PHYSICAL
                HADR_SYNCMODE = NEARSYNC
                  STANDBY_ID = 1
                LOG_STREAM_ID = 0
                  HADR_STATE = DISCONNECTED
            PRIMARY_MEMBER_HOST = 192.168.245.134
              PRIMARY_INSTANCE = DB2INST
                PRIMARY_MEMBER = 0
            STANDBY_MEMBER_HOST = 192.168.245.135
              STANDBY_INSTANCE = DB2INST
                STANDBY_MEMBER = 0
            HADR_CONNECT_STATUS = DISCONNECTED
       HADR_CONNECT_STATUS_TIME = 11/18/2013 16:16:40.458192
(1384751800)
      HEARTBEAT_INTERVAL(seconds) = 30
         HADR_TIMEOUT(seconds) = 120
    TIME_SINCE_LAST_RECV(seconds) = 0
       PEER_WAIT_LIMIT(seconds) = 0
     LOG_HADR_WAIT_CUR(seconds) = 0.000
 LOG_HADR_WAIT_RECENT_AVG(seconds) = 0.000000
LOG_HADR_WAIT_ACCUMULATED(seconds) = 0.000
…
```

(3) Reintegrate into HADR on the failed test node

```
C:\Program Files (x86)\IBM\SQLLIB\BIN>db2 start hadr on db hadb as
standby
DB20000I  The START HADR ON DATABASE command completed
successfully.
```

Troubleshooting

1. preprpnode returns error

```
$ preprpnode host1 host2
/usr/sbin/rsct/bin/lsrsrc-api: 2612-022 A session could not be established with the RMC daemon on host2.
preprpnode: 2602-344 Unable to obtain the public key from host2.
```

Reason:

There is a firewall between the servers.

Action:

In “Configure Windows Firewall”, choose “Turn off Windows Firewall”

2. Diagnostic information

(1) OS log
/var/adm/log/messages